

***VALIDATION OF A RADAR DOPPLER SPECTRA SIMULATOR USING
MEASUREMENTS FROM THE ARM CLOUD RADARS***

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ABSTRACT

The use of forward models as an alternative approach to compare models with observations contains advantages and challenges. Radar Doppler spectra simulators are not new; their application in high- resolution models with bin microphysics schemes could help to compare model output with the Doppler spectra recorded from the vertically pointing cloud radars at the ARM Climate Research Facility sites. The input parameters to a Doppler spectra simulator are both microphysical (e.g., particle size, shape, phase, and number concentration) and dynamical (e.g., resolved wind components and sub-grid turbulent kinetic energy). Libraries for spherical and non-spherical particles are then used to compute the backscattering cross-section and fall velocities, while the turbulence is parameterized as a Gaussian function with a prescribed width. The Signal-to-Noise Ratio (SNR) is used to determine the amount of noise added throughout the spectrum, and the spectral smoothing due to spectral averages is included to reproduce the averaging realized by cloud radars on successive returns. Thus, realistic Doppler spectra are obtained, and several parameters that relate to the morphological characteristics of the synthetically generated spectra are computed. Here, the results are compared to the new ARM microARSCL data products in an attempt to validate the simulator. Drizzling data obtained at the SGP site by the MMCR and the AMF site at Azores using the WACR are used to ensure the liquid part and the turbulence representation part of the simulator are properly accounted in the forward model.

This poster will be displayed at ASR Science Team Meeting.